

## Internal Seminar

### **A Tetranuclear Cobalt (II) Phosphate Possessing a D4R Core: An Efficient Water Oxidation Catalyst**

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The quest for renewable and sustainable energy sources is a fundamental theme of research in recent years.<sup>1</sup> Water splitting is considered as the most elegant approach as a resource of energy storage and fuel production.<sup>2</sup> A tetranuclear cobalt-based complex,  $[\text{Co}^{\text{II}}(\text{L})(\text{CH}_3\text{CN})]_4(\text{CH}_3\text{CN})_5$ , [ $\text{LH}_2=2,6$ -(diphenylmethyl)-4-isopropylphenyl phosphate], has been found as an efficient catalyst for the electro catalytic oxidation of water under a strong alkaline medium. This is the first report on the utilization of molecular cobalt phosphates as a catalyst for the oxidation of water. Alternatively, the mononuclear analogue,  $[\text{Co}^{\text{II}}(\text{LH})_2(\text{CH}_3\text{CN})_2(\text{MeOH})_2](\text{MeOH})_2$  does not respond towards electro catalytic water oxidation. We strongly believe that this result will spur more efforts on design-based assembly of molecular architectures that can be actively involved in the electro catalytic water oxidation. In the presentation, I will cover the detailed studies on the tetranuclear Co-complex as an efficient and robust catalyst for the electro catalytic water oxidation.

#### **References:**

(1) Lewis, N. S.; Nocera, D. G. Powering the planet: Chemical challenges in solar energy utilization PNAS USA 2006, 103, 15729.

(2) Kuttassery, F.; Mathew, S.; Remello, S. N.; Thomas, A.; Sano, K.; Ohsaki, Y.; Nabetani, Y.; Tachibana, H.; Inoue, H. Alternative route to bypass the bottle-neck of water oxidation: Two-electron oxidation of water catalysed by earth-abundant metalloporphyrins Coord. Chem. Rev. 2018, 377, 64.

***Tuesday, Oct 1<sup>st</sup> 2019***

***10:00 AM (Tea/Coffee at 9:30 AM)***

***Seminar Hall, TIFR-H***